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THE MINERAL INDUSTRY OF PENNSYLVANIA IN 1982

William Kebblish

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
OFFICE OF RESOURCES MANAGEMENT
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist

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The Mineral Industry of Pennsylvania

This chapter has been prepared under a Memorandum of Understanding between the Bureau of Mines, U.S. Department of the Interior, and the Pennsylvania Bureau of Topographic and Geologic Survey, Department of Environmental Resources, for collecting information on all nonfuel minerals.

By William Kebblish[1]

The value of Pennsylvania's nonfuel mineral production was $602.6 million in 1982, a $36.2 million decrease from that of 1981. The decline reflected poor economic conditions curtailing activities in nearly all mineral-related industries. Despite the depressed economy, Pennsylvania led the Nation in sales of iron and steel slag and regenerator iron oxides. The State ranked third in the production of expanded perlite and in shipments of cement and pig iron; and fourth in sales of lime, tripoli, and zinc. Nationally, Pennsylvania ranked 12th in value of total nonfuel mineral output.

Trends and Developments.—At yearend, improvement in the economy indicated possible reversal of the Nation's eighth post-World War II recession. Housing starts improved, industrial production increased, and the inflation rate declined.

Table 1.—Nonfuel mineral production in Pennsylvania[1]

Mineral	1981 Quantity	1981 Value (thousands)	1982 Quantity	1982 Value (thousands)
Cement:				
Masonry thousand short tons	293	$14,799	256	$14,048
Portland do	5,150	215,883	4,800	212,945
Clays[2] do	1,246	7,497	931	5,616
Gem stones	NA	5	NA	5
Lime thousand short tons	1,690	85,418	1,297	70,902
Mica (scrap) do	3	134	W	W
Peat do	25	647	27	669
Sand and gravel:				
Construction do	e14,000	e61,100	13,081	55,527
Industrial do	W	W	969	13,589
Stone:				
Crushed do	53,258	207,821	p50,400	p200,900
Dimension do	51	7,193	p48	p6,354
Tripoli short tons	1,263	W	W	W
Zinc (recoverable content of ores, etc.) metric tons	24,732	24,293	24,762	21,001
Combined value of clays (kaolin) and values indicated by symbol W	XX	13,966	XX	998
Total	XX	r638,756	XX	602,554

eEstimated. pPreliminary. rRevised. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined value" figure. XX Not applicable.

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

[2]Excludes kaolin; value included with "Combined value" figure.

Table 2.—Value of nonfuel mineral production in Pennsylvania, by county[1]

(Thousands)

County	1980	1981[2]	Minerals produced in 1981 in order of value
Adams	$20,603	W	Lime, stone (crushed), clays, mica (scrap).
Allegheny	W	W	Cement, clays, sand and gravel (industrial), stone (crushed).
Armstrong	W	$1,674	Stone (crushed), clays.
Beaver	W	W	Clays.
Bedford	W	W	Stone (crushed).
Berks	W	W	Cement, stone (crushed), clays.
Blair	W	7,670	Stone (crushed).
Bradford	889	(3)	
Bucks	W	W	Stone (crushed), stone (dimension), clays.
Butler	29,295	W	Lime, stone (crushed), cement, stone (dimension).
Cameron	W	(3)	
Carbon	W	W	Stone (crushed).
Centre	35,609	W	Lime, stone (crushed), clays.
Chester	W	W	Stone (crushed), lime, stone (dimension), clays.
Clarion	W	(3)	
Clearfield	W	336	Clays.
Clinton	W	W	Clays, stone (crushed).
Columbia	W	W	Stone (crushed).
Crawford	667	(3)	
Cumberland	W	4,435	Stone (crushed).
Dauphin	W	3,174	Do.
Delaware	W	W	Stone (crushed), stone (dimension).
Elk	66	103	Stone (crushed).
Erie	4,484	61	Peat.
Fayette	W	W	Stone (crushed), clays.
Forest	W	(3)	
Franklin	W	W	Stone (crushed), stone (dimension).
Fulton	W	W	Stone (crushed).
Huntingdon	W	W	Sand and gravel (industrial), stone (crushed).
Jefferson	W	W	Clays, stone (crushed).
Juniata	W	366	Stone (crushed).
Lackawanna	828	W	Stone (crushed), peat.
Lancaster	W	W	Stone (crushed), clays.
Lawrence	W	W	Cement, stone (crushed), clays, peat.
Lebanon	W	W	Lime, stone (crushed).
Lehigh	W	W	Cement, zinc, stone (crushed), stone (dimension).
Luzerne	W	1,067	Stone (crushed), peat, clays.
Lycoming	W	W	Stone (crushed).
McKean	W	W	Stone (crushed), clays.
Mercer	W	W	Stone (crushed).
Mifflin	1,042	W	Stone (crushed), lime.
Monroe	W	W	Stone (crushed), clays, peat.
Montgomery	15,925	W	Stone (crushed), lime, stone (dimension).
Montour	W	W	Stone (crushed).
Northampton	120,043	W	Cement, stone (crushed), stone (dimension), clays.
Northumberland	W	W	Stone (crushed), clays, tripoli.
Perry	W	W	Stone (crushed).
Philadelphia	W	(3)	
Pike	1,025	377	Stone (crushed).
Potter	--	W	Stone (dimension).
Schuylkill	W	1,002	Stone (crushed).
Snyder	W	W	Do.
Somerset	3,766	3,207	Clays, stone (crushed).
Susquehanna	W	1,254	Stone (crushed), stone (dimension).
Tioga	W	W	Stone (crushed).
Union	W	W	Stone (crushed), clays.
Venango	1,035	W	Stone (crushed).
Warren	1,733	(3)	
Wayne	W	671	Stone (crushed), stone (dimension).
Westmoreland	W	9,934	Stone (crushed).
Wyoming	W	(3)	
York	52,430	45,848	Stone (crushed), cement, lime, clays.
Undistributed[4]	378,167	496,476	
Sand and gravel (construction)	XX	e61,100	
Total[5]	667,606	638,756	

eEstimated. W Withheld to avoid disclosing company proprietary data; included with "Undistributed." XX Not applicable.

[1]Cambria, Greene, Indiana, Sullivan, and Washington Counties are not listed because no nonfuel mineral production was reported.

[2]County distribution for construction sand and gravel is not available; total State value shown separately under "Sand and gravel (construction)."

[3]Construction sand and gravel was produced; data not available by county.

[4]Includes gem stones that cannot be assigned to specific counties and values indicated by symbol W.

[5]Data may not add to totals shown because of independent rounding.

Table 3.—Indicators of Pennsylvania business activity

		1981	1982[p]	Change, percent
Employment and labor force, annual average:				
Total civilian labor force	thousands	5,482.0	5,482.0	--
Unemployment	do	458.0	599.0	+30.8
Employment (nonagricultural):				
Mining[1]	do	45.4	45.6	+.4
Manufacturing	do	1,299.0	1,167.1	-10.2
Contract construction	do	180.7	166.8	-7.7
Transportation and public utilities	do	258.6	248.0	-4.1
Wholesale and retail trade	do	989.1	970.0	-1.9
Finance, insurance, real estate	do	240.8	238.5	-1.0
Services	do	1,011.8	1,044.8	+3.3
Government	do	703.4	680.4	-3.3
Total nonagricultural employment[1 2]	do	4,728.9	4,561.3	-3.5
Personal income:				
Total	millions	$123,057	$129,844	+5.5
Per capita		$10,366	$10,943	+5.6
Construction activity:				
Number of private and public residential units authorized		24,495	20,912	-14.6
Value of nonresidential construction	millions	$1,285.6	$818.9	-36.3
Value of State road contract awards	do	$300.0	$275.0	-8.3
Shipments of portland and masonry cement to and within the State	thousand short tons	2,402	2,310	-3.8
Nonfuel mineral production value:				
Total crude mineral value	millions	$638.8	$602.6	-5.7
Value per capita, resident population		$53	$51	-3.8
Value per square mile		$13,964	$13,292	-4.8

[p]Preliminary.
[1]Includes coal (anthracite and bituminous), gas, and oil extraction.
[2]Data may not add to totals shown because of independent rounding.

Sources: U.S. Department of Commerce, U.S. Department of Labor, Highway and Heavy Construction Magazine, and U.S. Bureau of Mines.

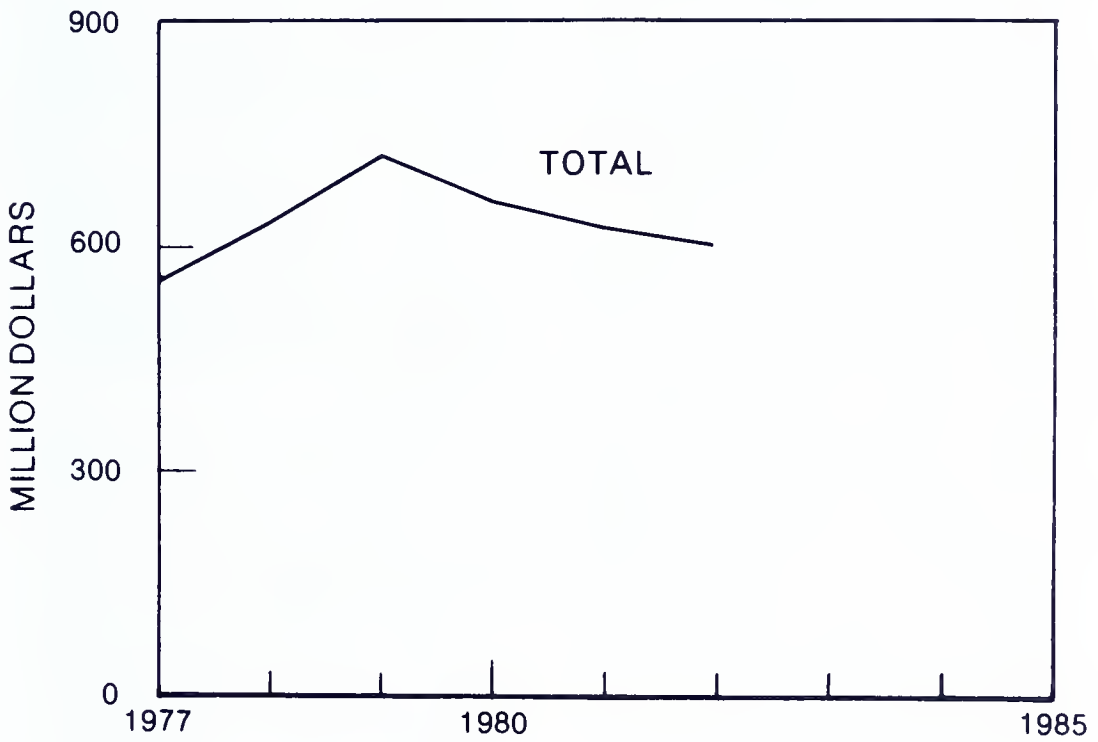

Figure 1.—Total value of nonfuel mineral production in Pennsylvania.

Pennsylvania's basic iron and steel industries, however, showed little improvement at yearend. Practically all steel companies showed deficits and reorganized to trim losses. United States Steel Corp., the Nation's largest steelmaker, reorganized all steel operations, resulting in closure of marginal operations and massive layoffs. At yearend, 19,530 employees, or two-thirds of the company's work force in western Pennsylvania, were idle.[2] Bethlehem Steel Corp., the second largest steel producer in the Nation, closed many of its operations in Johnstown and Bethlehem, while Jones & Laughlin Steel Corp. (J&L), a subsidiary of LTV Corp., the No. 3 producer, idled more than 6,000 employees at its Pittsburgh and Aliquippa Works. Other steps included reopening of contract negotiations between industry and labor officials. Although discussions were not finalized at yearend, many worker concessions, including wage reductions, were proposed, with resumption of benefits when steel operations again become profitable.

State officials, in an attempt to assist the ailing steel industry, formed a 43-member caucus consisting of government, labor, and industry leaders. Its main objective was to develop legislation to help the State's steel industry to survive.

Certain environmental requirements were modified by local governments to allow steel producers additional time for eventual compliance. The Allegheny County Board of Health approved the "bubble concept," a plan for plant compliance instead of individual source compliance.

State officials also approved a $10 million tax-free bond for modernization and expansion at the Allegheny Ludlum Steel Corp. plant in Westmoreland County.

A general trend among Pennsylvania companies was to improve productivity and product quality similar to that of many European and Asian countries, notably Japan. Westinghouse Electric Corp. adopted "quality circles" consisting of employees and their supervisors who meet voluntarily to discuss ways to improve products. United States Steel established labor-management teams at the Irvin Works south of Pittsburgh to improve steel products and increase productivity.

Water-related transportation occurrences included sale of United States Steel's three bargelines to Allen & Co. Inc. Two of the three bargelines operated in western Pennsylvania, moving steel, scrap, and aggregate to market. At Lake Erie, the 1,000-foot taconite ore carrier *Presque Isle* remained docked during the first part of the year owing to lack of iron ore demand at Pittsburgh steel plants. In the Pittsburgh area, the U.S. Army Corps of Engineers continued operation of locks and dams in navigable rivers, although Federal austerity measures indicated closure of certain facilities on the Allegheny River.

Other transportation-related occurrences included Standard Steel Co.'s development of a forged railroad wheel that is competitive with cast wheels; Bethlehem Steel's reopening of the railroad car shop in Johnstown for manufacture of 580 Coalporter gondola cars for System Fuels Inc. in addition to 350 open-top railroad cars for the Denver & Rio Grande Western Railroad Co.; reduction in tank car production by ACF Industries, Amcar Div., Milton, Northumberland County, from 3 to 2 cars per day; and closure in February of the Pullman Standard Inc. plant at Butler, Butler County, a large producer of freight cars, affecting 2,900 workers. GATX Corp. reduced production of tank cars at its Sharon plant in western Pennsylvania and Consolidated Rail Corp. (Conrail) closed its Altoona car repair shops for 5 weeks and sold 40.4 miles of track in the Wilkes-Barre and Scranton areas to Pocono Northeast Railway Inc. Conrail also reduced rail rates for steel sheet and strip in coils from eastern Pennsylvania to cities in the Mahoning Valley in Ohio.

Exploration Activities.—An international group of 17 geologists spent 6 days in Pennsylvania examining Upper Ordovician and Upper Devonian rocks in areas stretching from Kinzua Lake in Warren County to Delaware Water Gap in the eastern part of the State. The field trip followed an international symposium held in Ontario, Canada, in late August.

Exploration activity continued at a feverish pace throughout the State, especially in the Eastern Overthrust Belt, an area similar to the Western Overthrust Belt in the Rocky Mountains. The former belt parallels the Appalachian Mountains and consists of folded and faulted Lower and Middle Paleozoic strata. During the year, a record high 3,500 oil and gas wells were drilled. Quantities of oil and gas were located, and in some instances, drillers allegedly discovered traces of gold and other base minerals.

Legislation and Government Programs.—At midyear, the U.S. Department of the Interior approved Pennsylvania's surface mining regulations, including the

Abandoned Mined Land Reclamation Program, making available $39.5 million for reclamation programs within the State. The funds were collected by the U.S. Office of Surface Mining from coal mine operators for distribution to States having an approved regulatory program. Although the revised State mining regulations pertain mainly to coal, sections 97.31 to 97.35 and 97.72 of the Pennsylvania Code affect activities other than coal mining, such as river dredging and waste disposal.

Pennsylvania's revised solid waste management regulations, 25 Pennsylvania Code, chapter 75, became effective September 4, 1982. These revisions, which conform to Federal guidelines, allow for regulation of solid and hazardous waste within State boundaries. Excluded as hazardous wastes are cement kiln dust, drilling fluids associated with exploration development or production of certain fuels, mining overburden returned to the minesite, solid waste generated from extraction, beneficiation, processing of ores and minerals, and various others.

To assist the State's economy, the Governor signed H.B. 2344 into law on December 6, 1982, changing the Pennsylvania Science and Engineering Foundation to the Ben Franklin Partnership Board, establishing two technology centers in the State. At the Pittsburgh center, studies include bioengineering, coal technology, and new materials. At the Bethlehem center, research includes polymer materials, biotechnology and computer-aided design, and manufacturing.

The Governor also signed into law Senate bills 457 and 831 concerning revenues and repair or replacement of 979 bridges throughout the State, 522 of which are State-owned, 249 are owned by local government, and 208 are designated as "orphan" bridges or spans over railroads. The $1.4 billion program over the next 6 years means a boost to the State's depressed steel industry.

In fiscal year 1982, the Federal Government returned $1.09 million to the State for its share of funds generated by activities on national forest lands (timbering, minerals leasing, recreation, user fees, etc.). Allegheny National Forest is located in northwestern Pennsylvania and is under the jurisdiction of the U.S. Department of Agriculture. Extraction of minerals may be permitted on parts of the 510,000-acre forest and the Erie National Wildlife Refuge. To permanently protect parts of the national forest, Federal legislation was proposed reserving acreage as a wilderness and national recreation area. This designation would ban all types of mining and preserve the pristine nature of the land.

Active contracts and grants awarded to Pennsylvania organizations by the U.S. Bureau of Mines during the fiscal year totaled $7.2 million. The largest individual monetary contracts included $2.2 million for an exploratory drilling and pumped slurry back-filling project at Dunmore, Lackawanna County; $260,000 for field demonstration of aquifer dewatering coordinated with the planning and development of a new underground coal mine at Meadville, Crawford County; and $230,000 for mine demonstrations of longwall dust control techniques at Monroeville, Allegheny County.

The U.S. Bureau of Mines completed a new research facility known as the Lake Lynn Laboratory in Fayette County. The facility was dedicated September 1, 1982, primarily for explosive and mine fire research projects. The laboratory was constructed in an abandoned limestone mine approximately 60 miles south of Pittsburgh.

Basic research on sealing abandoned mine openings was done in various mines in Pennsylvania and Ohio as reported in U.S. Bureau of Mines Report of Investigations (RI) 8729, "Building Seals by Pneumatic Stowing in Mine Closure Operations," and RI 8730, "Sealing Openings in Abandoned Mines by Pneumatic Stowing."

The Mining and Mineral Resources and Research Institute at the Pennsylvania State University in University Park, which was created under title III of Public Law 95-87, received $150,000 from the U.S. Bureau of Mines in fiscal year 1982 for operations and research.

During the year, the Pennsylvania Bureau of Topographic and Geologic Survey maintained basic programs involving geologic and topographic mapping, mineral resource studies, ground water investigations, numerous oil- and gas-related activities, and responses to more than 2,900 major mineral-related requests. At yearend, State Survey engineers continued to map areas of Altoona, Lewisburg, Hazleton, Sunbury, and the Pocono Mountains. Work continued on a tectonic map of Pennsylvania, with a statewide correlation chart completed. Mineral studies included completion of a coal resource map of the Altoona area, coal-crop maps, a coal-sampling program, and entrance of all State-related coal data into the National Coal Resources Data Bank. Addi-

tionally, studies continued in the Reading-Prong area and the Devonian sediments of north-central Pennsylvania for uranium occurrences.

To meet basic exploration needs, the State Survey published an "Oil and Gas Fields Map of Pennsylvania" showing 1,077 oil and gas fields and pools up until July 1, 1981. A revised geologic map of Pennsylvania was also published the same year. Both publications were used by many of the exploration companies seeking minerals and particularly fuels in the Appalachian region.

Other completed projects included a study of the geology along the Appalachian Trail, engineering characteristics of Pennsylvania's rock formations, and ground water data collection of the Susquehanna River Basin.

The State Survey's August 1982 issue of "Pennsylvania Geology" lists 142 ongoing research projects, reports, and articles relating to the geology of the State, some of which were undertaken by State geological personnel. Subject matter covers nearly all aspects of Pennsylvania geology.

REVIEW BY NONFUEL MINERAL COMMODITIES

NONMETALS

Abrasives (Manufactured).—Manufactured abrasives, consisting of steel shot and grit, were produced by Ervin Industries Inc. and Pangborn Co., both in Butler, Butler County, and Durasteel Abrasives Co. in Mount Pleasant, Westmoreland County. Shipments decreased in both quantity and value compared with 1981 levels. Finished products were used as abrasives. Silicon carbide, another manufactured product, was produced by Satellite Alloy Corp. in Springdale, Allegheny County, for nonabrasive applications.

Cement.—Despite decreased demand for cement in 1982, Pennsylvania continued to rank third nationally behind Texas and California in portland cement shipments and first in masonry cement shipments. Shipments of portland cement totaled 4.8 million tons valued at $212.9 million, a decrease of nearly 7% in quantity and a slight decrease in value compared with those of 1981. Portland cement was shipped from 14 plants in 7 counties; counties leading in tonnage shipped were Northampton and Lehigh. Principal producers were Société des Ciments Français, which owns the Coplay and Nazareth No. 1 and No. 2 plants, and Lone Star Industries Inc., which owns the Nazareth and Pittsburgh plants.

Masonry cement shipments in Pennsylvania totaled 256,000 tons valued at $14 million, a decrease of nearly 13% in quantity and 5% in value compared with 1981 levels. Shipments originated from 11 plants in 7 counties; counties leading in quantity shipped were Lehigh, Northampton, and Lawrence. Principal producers were Société des Ciments Français and Crane Co.

The drop in shipments of both portland and masonry cement was due mainly to curtailed residential, industrial, and commercial construction during the year. Raw materials used in cement manufacture were cement rock, limestone, and shale, with lesser amounts of clay, sand, iron ore, and gypsum.

During the year, many Pennsylvania cement companies were sold, closed, or made internal improvements to improve safety and/or plant efficiency.

Lehigh Portland Cement Co., Allentown, purchased Crane's Medusa Cement Co. white cement plant in West York, York County, while planning closure of its white cement plant in Northampton, Northampton County.

Lone Star Industries purchased the Marquette Co. cement plants—one in Pittsburgh, the others in five Central and Northeastern States—from Gulf + Western Industries Inc. (G+W).

Early in the year, National Gypsum Co. reconsidered and withdrew from sale its cement plant at Evansville, Berks County, owing to projected improvement in cement sales.

Louisville Cement Co. closed its plant at Bessemer, Lawrence County, during the year. The closure came 21 months after the firm announced a $16 million modernization program for the plant.

Penn-West Cement Co. Inc., West Winfield, Butler County, closed cementmaking operations in March and began purchasing clinker from Medusa Cement, Wampum, Lawrence County, for grinding at the Butler County plant. Grinding clinker with a small amount of gypsum added produces a cement in fine powder form.

At yearend, Martin Marietta Corp. planned closure of its Northampton plant. The

plant has been in continuous operation since 1889 and was formerly known as Dragon Cement Co.

Keystone Portland Cement Co., Bath, Northampton County, had excess cement inventory at yearend, with anticipated production cutbacks paralleling future sales.

Officials at Coplay Cement Co., Nazareth, Northampton County, redesigned and installed protective safety features for the coal-grinding and fuel injection system used for heating purposes. Summer electrical storms caused disruption to the system, resulting in dust explosions. Newly installed detection and suppression systems apparently have eliminated problems at the facility.

Whitehall Cement Manufacturing Co. (recently purchased by General Portland Inc.) and Keystone Portland Cement, both in eastern Pennsylvania, are using additives such as acetone, mixed with coal, to heat cement kilns.

Hercules Cement Co., Stockertown, Northampton County, is producing a sulfate-resistant cement for corrosive applications.

Clays.—Production of clay and shale in Pennsylvania decreased in both quantity and value compared with 1981 levels. Types produced were common clay and shale, fire clay, and kaolin. In 1982, 22 companies operated 54 clay and shale mines in 18 counties. Counties leading in output, in descending order, were Berks, Jefferson, and Adams.

The average unit value of all types of clay produced increased slightly to $6.90 per ton from 1981 to 1982. This increase in unit cost was due to a slight increase in kaolin production, which has a much higher unit value compared with that of other types of clay. Clay and shale and fire clay were used mainly in the manufacture of face brick and firebrick; kaolin was used for roofing granules and other general uses.

Glen-Gery Corp. was affected by the economic downturn, reducing output of brick from the operation at Watsontown, Northumberland County, which resulted in nearly 90% of employees being idled at the plant during the past 2 years.

General Refractories Co., Philadelphia, restructured operations owing to the economic recession, closing the Salina plant near Pittsburgh and relocating headquarters to the Pittsburgh district. General Refractories is one of the five largest refractory companies in the Nation.

Early in the year, Swank Refractories Co., Pittsburgh, was sold to Tokyo Yogyo Ltd. of Japan. Refractory plants that were sold included the operation at Irvona, Clearfield County, and the plant at Large, Allegheny County. Both plants produced clay-based refractory shapes and bricks.

Harbison-Walker Refractories Co., a division of Dresser Industries Inc., began producing tundish boards, a new refractory product used by the steel industry to line surge tanks holding molten metal. The tundish boards are produced at the company's plant at Clearfield, Clearfield County.

A new company, Bricemont & Associates, McMurray, Washington County, began refractory-testing services.

Allied Chemical Co., a subsidiary of Allied Corp., opened a refractory research center at State College, Centre County, to develop and improve refractory technology.

Envirosafe Inc. discussed plans for a waste landfill near Lancaster with local officials and residents. Plans included use of 135 acres of the 450-acre Narvon Mine property, the only producer of kaolin in the State. The waste treatment process involved mixture with fly and lime, eliminating contaminants prior to disposal.

Table 4.—Pennsylvania: Clays sold or used by producers, by use[1]

(Short tons)

Use	1981	1982
Common brick	29,617	33,341
Face brick	809,250	630,530
Firebrick, block and shapes	161,303	115,217
Flue linings	40,790	19,291
Mortar and cement, refractory	31,746	14,493
Portland and other cements	123,626	81,727
Tile: Drain, quarry, structural	34,409	32,034
Other[2]	15,310	4,031
Exports: Mortar, cement, other refractories	333	260
Total	1,246,384	930,924

[1]Excludes kaolin.
[2]Includes lightweight aggregates, paint, and sewer pipe (1981).

Fluorspar.—Although Pennsylvania had no production of fluorspar in 1982, the State ranked fourth nationally in consumption, using 51,955 tons, or nearly 10% of the Nation's total consumption of 530,565 tons. Compared with that of 1981, consumption dropped about 50% owing to a decline in steelmaking operations, which uses approximately 6 pounds of fluorspar per ton of steel produced. The fluorspar, when added to molten metal, assists in the desulfurization and dephosphorization of the metal, promotes slag fluidity, and enhances the solution of lime.

Gem Stones.—The value of gem stones collected in Pennsylvania in 1982 was estimated at $5,000, remaining unchanged from that of 1981. Specimens were collected mainly by amateurs and mineral dealers.

The Hillman Hall of Minerals and Gems at Carnegie Museum of Natural History, Pittsburgh, continued to be a popular tourist attraction. More than 2,500 mineral specimens are on display there, made possible by a grant by Hillman Foundation Inc.

Graphite (Synthetic).—Synthetic graphite production and value decreased in 1982 owing to the depressed economic conditions. Principal producers were located in Elk County in north-central Pennsylvania. Synthetic graphite is made from petroleum coke, lampblack, carbon black, and various amounts of natural graphite, mixed with carbonaceous binders and heated to high temperatures to produce the synthetic product.

Airco Speer Carbon Co. continued modernization of its electrode plant at St. Marys, even though the steel industry remained depressed. Graphite electrodes were used in electric furnaces to produce intense heat for steelmaking.

Other principal synthetic graphite producers included Keystone Carbon Co. (powdered metal parts, carbon brushes, and contacts), St. Marys Carbon Co. (powdered metal products and metal graphite parts), and The Stackpole Carbon Corp. (carbon products, electronic components, and motor brushes). The latter was the leading supplier of motor brushes to the U.S. automotive industry.

Gypsum (Calcined).—United States Gypsum Co. closed its gypsum calcining plant in Philadelphia owing to the poor housing market. Calcined gypsum was used mainly in the manufacture of prefabricated products, such as regular wallboard, type-X wallboard, and lath, for home construction.

Iodine.—Whitmoyer Laboratories Inc. in Lebanon County and West Agro-Chemical Inc. in Washington County brought in crude iodine for use in the manufacture of pharmaceuticals, catalysts, and sanitation products.

Iron and Steel Slag.—Pennsylvania ranked first nationally in 1982 in sales of iron and steel slag. Total slag processed amounted to 4.3 million tons valued at $21.8 million, a decrease of 9% in output but a slight increase in value compared with that of 1981. The decline in slag output reflected a drop in the State's pig iron production. Of the total slag produced, 86% was iron slag and the remainder was steel slag.

Types of iron slag sold included air-cooled, expanded, and granulated. Major uses of air-cooled slag were for asphalt and concrete aggregate and as a road base material and fill; expanded slag was used as lightweight aggregate; and granulated slag was used for road base material and fill. Steel slag was used mainly for road base material. Principal slag processors included Duquesne Slag Products Co. Inc., Dunbar Slag Co., and Standard Slag Co.

Lime.—Although lime production in Pennsylvania decreased 23% from that of 1981, the State ranked fourth nationally, accounting for 1.3 million tons, or about 9% of the national output. Lime was produced at 10 plants in 8 counties. Centre, with three plants, accounted for a substantial part of Pennsylvania's production. Other counties, in descending order of output, were Lebanon, Adams, Butler, York, Chester, Montgomery, and Mifflin.

Domtar Industries Inc., Centre County, closed its underground limestone mine and calcining plant near Bellefonte during the year. The mine is to be sold or closed permanently. Other lime-producing companies in Centre County included Marblehead Lime Co. in Pleasant Gap and Warner Co. with its operation in Bellefonte. During the year, Conrail proposed abandonment of a 17-mile section of track from Milesburg to Bellefonte. Permanent rail closure could impact lime producers in Centre County. Consumption of lime by the steel industry continued to decline, with decreases also noted for agriculture, sewage treatment, and acid water neutralization.

Table 5.—Pennsylvania: Lime sold or used by producers, by use

Use	1981		1982	
	Quantity (short tons)	Value (thousands)	Quantity (short tons)	Value (thousands)
Steel, basic oxygen furnace	620,542	$30,890	454,056	$23,207
Steel, electric	278,032	13,674	178,557	9,068
Sewage treatment	197,815	10,065	153,821	8,248
Water purification	110,531	5,930	104,468	5,685
Acid water neutralization	67,916	3,613	65,642	3,729
Steel, open-hearth	81,585	3,333	39,462	1,997
Mason's lime	49,433	2,261	49,329	3,716
Paper and pulp	20,657	991	18,123	880
Agriculture	29,456	1,562	12,837	782
Brick, sand-lime	3,991	234	3,517	215
Petroleum refining	3,408	187	2,481	137
Metallurgy, other	3,934	176	1,571	80
Other[1]	222,427	12,502	213,289	13,158
Total	1,689,727	85,418	1,297,153	70,902

[1]Includes alkalies, glass, oil well drilling, ore concentration, other chemical and industrial uses, paint, petrochemicals, precipitated calcium carbonate, refractories, silica brick, soil stabilization, sulfur removal from stack gases, tanning, and wire drawing.

Mica.—Only one company in the State produced crude mica in 1982. Gross Minerals Corp. near Aspers, Adams County, produced scrap and flake mica from an underground mining operation.

Mullite (Synthetic).—Only one company in Pennsylvania produced synthetic mullite. A. P. Green Refractories Co., Philadelphia County, heated an aluminum-silicate mixture to approximately 3,000° F, producing the heat-resistant material. Mullite in general is used in furnace linings, refractories, and glass products. Shipments of the synthetic product decreased in quantity from 1981 to 1982 owing to a general downturn in the economy.

Peat.—Pennsylvania ranked eighth of 20 States in peat sales in 1982 with 26,974 tons valued at about $669,000, a slight increase in both quantity and value compared with 1981 figures. Peat production occurred mainly in the eastern part of the State and, to a lesser extent, in the Erie vicinity. Principal producers were Gouldsboro Wayne Peat Co., Lackawanna County, and Corry Peat Products Co., Erie County. The processed peat was used mainly for agricultural and horticultural purposes.

Perlite (Expanded).—Crude perlite mined out of State was shipped into Pennsylvania and expanded at six plants by five companies. Expanded perlite sold and used in the State amounted to 38,600 tons valued at $5.8 million, reflecting an increase of 6% in production and 19% in value compared with those of 1981. Plants in western Pennsylvania were the Therm-O-Rock Div. of Allied Chemical in New Eagle, Washington County, and Perlite Manufacturing Co. of Pittsburgh Inc. in Carnegie, Allegheny County. Producers in eastern Pennsylvania were World Industries Inc., Pennsylvania Perlite Corp., and United States Gypsum. Most of the perlite plants were relatively small, employing 12 to 21 persons. Perlite was used mainly in plaster and cement aggregates and for horticulture purposes.

Pyrophyllite.—American Olean Tile Co. near Landsdale, Montgomery County, imported raw pyrophyllite from its Canadian mine. The amount of raw ore imported decreased in both quantity and value in 1982. The ground product was used in the manufacture of ceramic products.

Quartz Crystal (Synthetic).—Bliley Electric Co., at Erie, and P. R. Hoffman Co., a division of Norlin Corp., at Carlisle, used lasca, a nonelectronic-grade quartz material used as feedstock for growing cultured quartz crystal. All cultured quartz crystal produced was used internally by both companies. Other consumers of cultured crystal in Pennsylvania were Anderson Electronics Inc., Blair County; Dynamics Corp. of America, Cumberland County; Erie Frequency Div. of Erie Technological Products, Erie County; McCoy Electronics Co., Cumberland County; J. K. Miller Co. Inc., Allegheny County; and Piezo Crystal Co. Inc., Cumberland County. Major uses of cultured quartz was for oscillators used in the manufacture of timepieces, televisions, and citizens band radios.

Sand and Gravel.—*Construction.*—As a result of the new canvassing procedures implemented by the U.S. Bureau of Mines in 1980, no annual survey of construction sand and gravel producers was conducted for 1981. Based on partial production information for 1981, collected with the 1982 survey, final estimates of construction sand and gravel production in 1981 were gener-

ated and are given in table 1. Construction sand and gravel was one of the principal nonfuel minerals produced in Pennsylvania, ranking fourth behind cement, stone, and lime in sales. Output totaled 13.1 million tons valued at $55.5 million, representing a decrease of 7% in quantity and 9% in value compared with 1981 estimated figures. Average unit value was $4.24 compared with an estimated $4.36 in 1981.

Construction sand and gravel was produced in 34 of the State's 67 counties, located northwest and east of the Appalachian Mountains. Counties leading in output in the western part of the State were Armstrong, Beaver, and Erie; in the eastern part, Bucks, Columbia, and Lycoming. There was no sand and gravel production in either the Philadelphia or Pittsburgh areas, but adjacent counties supplied needed quantities.

Leading producers were Davison Sand & Gravel Co., Dravo Corp., and Warner Co., all located near metropolitan areas. These three companies accounted for 32% of the State's production. A total of 98 sand and gravel companies operated 123 pits. Davison Sand & Gravel, Tionesta Sand & Gravel Co., and H. W. Copper & Sons Inc. constituted larger operations, producing from four deposits each in Armstrong, Warren, and Butler Counties, respectively.

One company in Pennsylvania produced more than 1 million tons in 1982 from a single operation. A total of 37 pits yielded from 100,000 to 1 million tons each and had a combined output of 9.1 million tons. The remaining 85 pits each produced less than 100,000 tons each, resulting in a total output of 2.7 million tons and accounting for 20% of the State's total production. The significance of a large number of sand and gravel companies accounting for only a fraction of the State's output can be traced to localized markets and high transportation costs for a low unit-valued commodity. In 1982, nearly 84% of the State's sand and gravel was transported to market by truck; the remainder, by railroad, waterway, and other means. Construction sand and gravel was used mainly for concrete aggregate, asphaltic concrete, and road base and coverings.

Table 6.—Pennsylvania: Construction sand and gravel sold or used in 1982, by major use category

Use	Quantity (thousand short tons)	Value (thousands)	Value per ton
Concrete aggregate	4,559	$20,676	$4.53
Plaster and gunite sands	363	1,694	4.66
Concrete products	1,107	5,482	4.95
Asphaltic concrete	2,413	12,550	5.20
Road base and coverings[1]	3,346	11,263	3.37
Fill	891	2,195	2.46
Snow and ice control	168	645	3.84
Railroad ballast	24	84	3.50
Other	208	938	4.50
Total or average	[2]13,081	55,527	4.24

[1]Includes road and other stabilization (cement).
[2]Data do not add to total shown because of independent rounding.

Table 7.—Pennsylvania: Sand and gravel sold or used by producers

	1981			1982		
	Quantity (thousand short tons)	Value (thousands)	Value per ton	Quantity (thousand short tons)	Value (thousands)	Value per ton
Construction:						
Sand	NA	NA	NA	5,044	$22,989	$4.56
Gravel	NA	NA	NA	7,189	30,402	4.23
Sand and gravel (unprocessed)	NA	NA	NA	849	2,136	2.52
Total or average	e14,000	e$61,100	e$4.36	[1]13,081	55,527	4.24
Industrial sand	W	W	13.18	969	13,589	14.02
Grand total or average	W	W	e4.93	14,050	69,116	4.92

eEstimated. NA Not available. W Withheld to avoid disclosing company proprietary data.
[1]Data do not add to total shown because of independent rounding.

Industrial.—In 1982, industrial sand in Pennsylvania sold for $14.02 per ton compared with $4.24 for construction sand and gravel.

From 1981 to 1982, production of industrial sand in Pennsylvania remained about the same. Industrial sand was produced by four companies. Airport Sand & Gravel Co. Inc., Luzerne County, operated one deposit; Glacial Sand & Gravel Co., Armstrong County, one deposit; McGrady Inc., Allegheny County, two deposits; and Pennsylvania Glass Sand Corp., Huntingdon County, two deposits. Industrial sand was used mainly for glass products, with lesser amounts used for molds and cores, in refractories and fillers, and for other purposes.

Stone.—To reduce reporting burdens and costs, the U.S. Bureau of Mines implemented new canvassing procedures for its surveys of stone producers in 1981. The survey of stone producers will be conducted for odd-numbered years only, and only preliminary estimates for crushed and dimension stone production will be published for even-numbered years. The preliminary estimates will be revised the following year.

Sulfur (Recovered).—Elemental sulfur was recovered from desulfurization of refinery gases and treatment of natural gas at three petroleum refineries, two in Philadelphia County and one in Delaware County. A steel company in Allegheny County recovered byproduct sulfur from coke production. Shipments of recovered sulfur in Pennsylvania during 1982 amounted to 56,513 metric tons valued at $4.8 million, nearly the same figures as those of 1981. Principal uses were in the manufacture of sulfuric acid, for leaching of ores, and in chemicals, fibers, paints, and explosives.

Tripoli.—The Keystone Filler & Manufacturing Co. Sheddy Mine in Northumberland County produced tripoli, which was used as an abrasive and filler. Both production and value increased from 1981 to 1982. Also known as rottenstone, tripoli consists of fine-grained silica resulting from decomposition of siliceous limestone.

Vermiculite (Exfoliated).—Beneficiated vermiculite mined in other States was shipped into Pennsylvania and exfoliated by A-Tops Corp. in Allegheny County and W. R. Grace & Co. in Lawrence County. Sales of exfoliated vermiculite dropped nearly 13% in quantity and 30% in value from 1981 to 1982. Unit value of exfoliated vermiculite was nearly $203 per ton, a decrease of $52 from that of 1981. Major uses were for lightweight concrete aggregate, loose fill insulation, horticultural purposes, and soil conditioning.

METALS

Aluminum.—Although primary aluminum is not produced in Pennsylvania, secondary plants continued to modernize operations. United States Aluminum Corp., a subsidiary of United States Reduction Co. and owned by American Can Co., began implementation of environmental programs relating to noise and dust abatement at the aluminum scrap smelting plant at Marietta, Lancaster County.

Aluminum Co. of America (Alcoa) completed a $60 million expansion at its plant at Lebanon, Lebanon County, consisting of two continuous casters, a cold-rolling mill, and support furnaces. In western Pennsylvania, a new continuous ball mill at the Logans Ferry plant was nearing completion at yearend, designed to increase output of powder and pigment products. Alcoa continued its aluminum can recycling program. Beverage cans collected in Pennsylvania contributed to Alcoa's 205,000 metric tons of used beverage cans recycled nationwide.[3]

Beryllium.—The Cabot Berylco Div. of Cabot Corp. produced beryllium copper and other beryllium alloys at its plant at Reading, Berks County. Plant modernizations that include annealing and finishing equipment will allow production of thin beryllium copper strip up to 50 inches wide and down to two-thousandths of an inch thick. The thin strips allow for selective plating methods or improved inlay products.

Cadmium.—The New Jersey Zinc Co. Inc., Lehigh County, produced cadmium, a byproduct of zinc smelting. Cadmium was used for electroplating, plastic stabilizers, and pigments.

Ferroalloys.—In 1982, ferroalloy shipments in Pennsylvania totaled 4,029 tons valued at $29.7 million, reflecting decreases in both quantity and value compared with 1981 figures. Seven ferroalloy plants were located in the State—two in Lawrence County, two in Washington County, and one each in Berks, Bucks, and Chester Counties. Ferroalloys of aluminum, boron, columbium, molybdenum, and vanadium were produced. Ferroalloys were added to molten iron and steel for specific product characteristics.

During the year, ferroalloy companies modernized to become more competitive. Reading Alloys Inc., Robesonia, Berks County, lowered the price of ferrocolumbium to compete with foreign imports. AMAX Inc.,

Climax Molybdenum Div., Langeloth, Washington County, reduced its work force by 33% and at yearend temporarily closed operations until ferroalloy markets improve. Molycorp Inc., Washington County, dedicated a new molybdenum roaster and samarium ingot facility. Ore from the company's mine at Questa, N. Mex., is processed at the Washington County facility. Reactive Metals & Alloys Corp., West Pittsburgh, Lawrence County, operated a new $4 million submerged-arc furnace and a crucible for development of new alloys.

Other ferroalloy companies based in Pennsylvania with plants in other States included Elkem Metals Co., Pittsburgh, owned by Norwegian interests and formed in 1981 when certain plants were purchased from Union Carbide Corp., making Elkem the Nation's largest supplier of ferroalloys; and Foote Mineral Co., Exton, Chester County, the Nation's third largest producer of ferroalloys.

Iron Oxide Pigments.—In 1982, Pennsylvania led the Nation in shipment of regenerator iron oxides produced from steel plant waste and ranked second behind Illinois in shipments of finished iron oxide pigments. Pennsylvania regenerator iron oxide shipments totaled 7,802 tons valued at $419,000, a decline of 30% in quantity and 37% in value compared with 1981 figures. Finished iron oxide pigments totaled 24,663 tons valued at $27.8 million, a decrease of 22% in quantity with value remaining essentially the same.

Regenerator iron oxides were produced in Bucks County; finished iron oxide pigments, in Carbon, Chester, Montgomery, and Northampton Counties. Producers included Chemalloy Co. Inc., Foote Mineral, Pfizer Inc., Prince Manufacturing Co., Reichard-Coulston Inc., and United States Steel. Iron oxide pigments were used mainly in paints and coatings, construction materials, and ferrites and other magnetic and electronic applications.

Iron and Steel.—The year 1982 was disastrous for Pennsylvania steel producers. Raw steel production remained at approximately 25% of capacity, causing the State to drop from first to third place behind Indiana and Ohio. Pennsylvania blast furnaces shipped 5.5 million tons of pig iron valued at $1.2 billion, a decrease of nearly 63% in quantity and 61% in value compared with 1981 figures. To keep production in line with demand, steel companies reduced work forces and closed or curtailed marginal operations. United States Steel, the Nation's largest steelmaker, had more than 50% of its work force of 81,000 workers idled throughout the Nation, with only one of six blast furnaces operating in the Pittsburgh area. Bethlehem Steel, the second largest steel producer in the Nation, reduced its work force and closed operations in Johnstown and Bethlehem. J&L experienced similar circumstances, as did all other integrated steel producers. To trim expenses further, contract negotiations between union and company representatives reopened early with talks of worker concessions and givebacks, including productivity changes leading to profitable operations. At yearend, contract talks continued, with labor agreeing to tentative contract changes to insure job stability and security.

Although the steel industry was particularly affected by the national economic recessions, many steel mill operators were looking beyond 1982, expecting a modest growth in subsequent years. Companies continued to modernize but on a more conservative level.

Allegheny Ludlum, a specialty steel producer at West Leechburg, Westmoreland County, planned an $11.1 million modernization program to include improvements to productivity equipment for the annealing line. Patented during the year was a new stainless alloy for catalytic converters.

American Shear Knife Div. of Asko Inc., Homestead, Allegheny County, developed a disposable knife used for cutting scrap metal. The knife has four cutting edges and is discarded when all cutting edges are dull.

Armco Inc., Butler, Butler County, began operating a second continuous caster as part of a $55 million expansion program.

Babcock & Wilcox Co. Tubular Products Group began installation of a slot furnace and heat-treating equipment at its Koppel plant at Beaver Falls, Beaver County.

The new Bethlehem Steel product, galvalume, was being produced worldwide by eight firms under licensing agreements. Galvalume is an aluminum-zinc, alloy-coated sheet steel used in construction of preengineered buildings.

Carpenter Technology Corp., Reading, Berks County, was constructing a $112 million hot-rolling steel mill on Route 61, a few miles from the current plant.

Champ Corp. purchased from G+W two malleable iron foundries at Landisville and Lancaster, both in Lancaster County. Improvements were planned for the Landisville plant.

Colt Industries Inc.'s Crucible Stainless &

Alloy Div. plant at Midland, Beaver County, which officially closed October 15, 1982, may be purchased, according to a yearend announcement, by J&L.

Continental Copper & Steel Industries Inc. planned installation of saws and mill furnaces at its Braeburn Alloy Steel Div., Hanover, York County.

Cyclops Corp. began a $2.4 million improvement project at its plant at Titusville, Crawford County. Modernization is to include installation of high-speed rolling mills, grinding machinery, and annealing furnaces, with completion slated for late 1983.

Dynamet Inc., Washington County, opened a specialty steel alloy plant during the year. The new bar and rod mill will produce high-temperature alloys and specialty steels for aerospace industries.

Empire Steel Castings Inc., Reading, Berks County, was acquired by private interests early in the year. Products included stainless, carbon, and low-alloy steel castings for the pump and valve industries.

International Metals Reclamation Co. Inc. (INMETCO), Ellwood City, recycles approximately 40,000 tons of waste annually, converting flue dust, mill scale, and swarf (oily grindings) into a useful remelt alloy for the stainless steel industry. Pittsburgh Pacific Processing, a unit of INMETCO, recycles spent catalysts from the production of edible fats and oils by thermal decomposition. The Pittsburgh plant became operational in 1982, with a capacity to process 25 million pounds of catalysts annually.

J&L acquired Cannonsburg Metal Service Inc., an independent stainless steel coil polishing facility located south of Pittsburgh. J&L converted a billet caster at its Aliquippa Works to a seamless tube rounds caster with the option for easy conversion back to a billet caster. If the purchase of Colt Industries' Crucible Stainless and Alloy Div. is completed, J&L will have the facilities to become the Nation's largest producer of stainless sheet and strip, surpassing Allegheny Ludlum, the current leading producer.

Samuel G. Keywell Co. planned to relocate a specialty steel scrap-processing facility from Warren, Mich., to Midland owing to possible startup of stainless steel operations at the Crucible plant currently for sale.

Lansdowne Steel & Iron Co., Norton, Delaware County, received Department of Defense equipment to produce artillery shells for training purposes. At yearend, company officials pondered plant expansion or relocation to another State.

Lukens Inc., Coatesville, Chester County, a major producer of carbon, alloy, clad plate steels, and plate steel shapes, purchased General Steel Industries Inc. of St. Louis, Mo., a diversified firm providing machinery, equipment, and services to industrial and energy markets.

Sandvik Specialty Steel Co., a division of Sandvik Inc., Sweden, opened a new wire mill at Clarks Summit near Scranton. The wire products are to be used by health and industrial concerns.

Tippins Machinery Co., Etna, near Pittsburgh, received a turnkey contract for design and construction of a 112-inch plate and hot strip mill for Highveld Steel & Vanadium Corp. Ltd., Republic of South Africa. Completion of the plant was expected in mid-1983.

United States Steel announced formation of a new Mon Valley Works to include the Homestead, Edgar Thomson, National, Duquesne, and Clairton facilities, all in the Pittsburgh area along the Monongahela River. Not included was the Irvin plant, which previously was merged into the Gary, Ind., Works. Galvalume is to be produced at the Irvin plant under a licensing arrangement with Bethlehem Steel. United States Steel also announced addition of five new machine centers at its Johnstown plant; preliminary plans for possible conversion of foreign steel slabs into finished products at its Fairless Hills plant near Philadelphia; sale of three marine subsidiaries to Allen & Co.; and sale of the United States Steel building in Pittsburgh, with retention as corporate headquarters. Company sales of assets are to be redeployed to strengthen company operating structure.

Wheeling-Pittsburgh Corp. officials completed a new labor contract with union representatives late in 1982, reducing worker benefits but providing other guarantees as profitability returns.

A Bessemer converter was dedicated as a historic symbol of steel technology in late 1982. The 10-ton converter was the last to operate in the Nation and is on display in downtown Pittsburgh. The converter was superseded by more productive processes such as the open-hearth, basic-oxygen, and electric furnaces.

A film documentary entitled "Labor Day" was completed in the summer of 1982 portraying the steel industry and effects on steel-dependent communities. The documentary was filmed in steel towns such as

Brackenridge, Butler, and various Monongahela Valley cities, all situated near Pittsburgh.

Coke.—Coke production in Pennsylvania decreased owing to the depressed steel industry. Coke is used as a fuel and a reducing agent in steelmaking. During the year, two large steel producers in western Pennsylvania reduced coke output. United States Steel scheduled a 4-week shutdown of its huge Clairton plant, south of Pittsburgh, while Bethlehem Steel, Johnstown, Cambria County, closed its last coke oven after producing coke for 87 years in the area. Coke is to be produced at other, more modern Bethlehem Steel facilities, with the coke shipped by Conrail under a 5-year agreement involving lower freight rates owing to specially designed cars built by Bethlehem Steel at the Johnstown plant.

Although all beehive coke ovens have closed, one is being relit. Alverton Coke Co. fired up one beehive coke oven as part of the Scottsdale Coal & Coke Heritage Festival. The oven, in Fayette County, was closed after the festival.

Titanium.—A. Johnson & Co., a division of Axel Johnson Group, a Swedish company, began operating an electron-beam furnace, converting scrap titanium and other metals into ingot, strip, and slab. The furnace is located in Morgantown, Berks County.

Allegheny Ludlum and Sumitomo Metal Industries Ltd., Japan, formed a partnership to market titanium products. Titanium is to be imported and processed into plate, strip, and sheet at plants near Pittsburgh. The new partnership will be known as ALS Metals Co.

Zinc.—Pennsylvania ranked fourth nationally in 1982 in zinc mine production with 24,762 metric tons, or 8% of the national output. Zinc was used for galvanizing and in alloys and brass products; zinc oxides, for rubber products and in paints, ceramics, and other products.

G+W anticipated closure of its underground zinc mine in Friedensville, south of Allentown, owing to economic conditions. At yearend, the mine continued to operate, producing approximately 4,000 tons of concrete per month.[4]

New Jersey Zinc, Palmerton, Carbon County, reduced its work force and production of zinc oxides owing to poor market conditions. This plant was purchased for G+W in 1981.

St. Joe Resources Co., Monaca, Beaver County, reopened its smelter and zinc refinery several years ago with raw material derived from a large zinc ore body discovered in St. Lawrence County, N.Y. Concentrates from the new mine and mill were shipped by rail to the Monaca facility for further processing. Modernization at the plant included new Larvik furnaces, with a fourth furnace scheduled in 1983; other equipment was installed to recycle waste material. Current capacity of the smelter is 75,000 tons of zinc annually.

Other Metals.—New Jersey Zinc and Indium Corp. formed a joint venture company known as NJZ Alloys Inc. to produce indium. Concentrate from the New Jersey Zinc plant at Palmerton, Carbon County, was shipped to Indium for further processing. Indium is used in electronic and electrical products.

Imported pollucite and lepidolite from Canada and Zimbabwe was used by the Cabot Corp., KBI Div., in Revere, Bucks County. The ores were used to produce cesium and rubidium used in the production of high-voltage rectifier tubes and various light and bulb products.

The General Services Administration agreed to purchase from Johnson Matthey Inc., at Malvern, 600 troy ounces of iridium for the National Defense Stockpile. Industry sources estimate the selling price at $320 per troy ounce. Iridium, when added to platinum, produces an alloy withstanding high temperatures.

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[1]State Liaison Officer, Bureau of Mines, Pittsburgh, Pa.
[2]Pittsburgh Post-Gazette. USS Layoffs Total 19,530. Jan. 4, 1983.
[3]Aluminum Co. of America. 1982 Annual Report. P. 22.
[4]Wall Street Journal. G&W Set To Suspend Some Zinc Operations, Idling 147 Employees. Dec. 14, 1982, p. 4.

Table 8.—Principal producers

Commodity and company	Address	Type of activity	County
Abrasives (manufactured):			
Durasteel Abrasives Co	2601 Smallman St. Pittsburgh, PA 15222	Plant	Westmoreland.
Ervin Industries Inc	Box 1168 Ann Arbor, MI 48106	do	Butler.
Satellite Alloy Corp	Satellite Industrial Park Box 171 Springdale, PA 15144	do	Allegheny.
Cement:			
Crane Co	300 Park Ave. New York, NY 10022	do	Lawrence.
Louisville Cement Co	501 South 2d St. Louisville, KY 40202	do	Do.
Penn-West Cement Co. Inc	R.D. 2 Cabot, PA 16023	do	Butler.
Société des Ciments Français	Tour Général, Quartier Villon Cédex 22 192088 Paris, La Défense France	do	Lehigh and Northampton.
Clays:			
Glen-Gery Corp	Box 1542 Reading, PA 19603	Pit	Adams, Berks, Northumberland, Union, York.
Harbison-Walker Refractories Co	2 Gateway Center Pittsburgh, PA 15222	Pit	Clearfield and Somerset.
Narvon Products Inc	Narvon, PA 17555	Pit	Lancaster.
Graphite (synthetic):			
Airco Speer Carbon Co	800 Theresia St. St. Marys, PA 15857	Plant	Elk.
Keystone Carbon Co	1935 State St. St. Marys, PA 15857	do	Elk.
The Stackpole Carbon Corp	St. Marys, PA 15857	do	Elk.
Iron oxide pigments:			
Pfizer Inc., Minerals, Pigments, & Metals Div	640 North 13th St. Box 548 Easton, PA 18042	do	Northampton.
Prince Manufacturing Co	700 Lehigh St. Bowmanstown, PA 18030	do	Carbon.
Reichard-Coulston Inc	1421 Mauch Chunk Rd. Bethlehem, PA 18018	do	Northampton.
Iron and steel slag:			
Bethlehem Mines Corp.[1 2]	701 East 3d St. Bethlehem, PA 18016	do	Cambria.
Dunbar Slag Co	Box 666 Sharon, PA 16146	do	Mercer.
Standard Slag Co	1200 Stambaugh Bldg. Youngstown, OH 44503	do	Cambria.
Lime:			
Bethlehem Steel Corp	Martin Tower Bethlehem, PA 18016	do	Adams and Lebanon.
Marblehead Lime Co	300 West Washington St. Chicago, IL 60606	do	Centre.
Mercer Lime & Stone Co	525 William Penn Dr. Pittsburgh, PA 15219	do	Butler.
Warner Co	Yellow Springs Rd. Devault, PA 19432	do	Centre.
Peat:			
Corry Peat Products Co	515 Turnpike Rd. Corry, PA 16407	Bog	Erie.
Gouldsboro Wayne Peat Co	Box 68 Gouldsboro, PA 18424	Bog	Lackawanna.
Lake Benton Peat Moss	622 South Blakely St. Dunmore, PA 18512	Bog	Do.
Perlite (expanded):			
Allied Block Chemical Co., Therm-O-Rock Div	Pine St. New Eagle, PA 15067	Plant	Washington.
Pennsylvania Perlite Corp	Box 2002 Lehigh Valley, PA 18001	do	Lehigh and York.
Perlite Manufacturing Co	Box 478 Carnegie, PA 15106	do	Allegheny.
United States Gypsum Co	101 South Wacker Dr. Chicago, IL 60606	do	Philadelphia.
World Industries Inc	Lancaster, PA 17603	do	Lancaster.
Sand and gravel:			
Construction:			
Davison Sand & Gravel Co	3d Ave. and 4th St. New Kensington, PA 15068	Dredge	Westmoreland.
Dravo Corp	4800 Grand Ave. Pittsburgh, PA 15222	do	Beaver.
Erie Sand Steamship Co	Box 153 Erie, PA 16512	do	Erie.

See footnotes at end of table.

Table 8.—Principal producers —Continued

Commodity and company	Address	Type of activity	County
Sand and gravel —Continued			
Construction —Continued			
Shippingport Sand & Gravel Co	355 5th Ave. Pittsburgh, PA 15222	Pit	Armstrong.
Warner Co.[1 2 3]	699 Briston Pike Morristown, PA 19067	Pit	Bucks.
Industrial:			
Glacial Sand & Gravel Co	Box 10 Kittanning, PA 16201	Pit	Armstrong.
McCrady Inc	Box 11566 Pittsburgh, PA 15238	Pits	Allegheny.
Pennsylvania Glass Sand Corp	Box 187 Berkeley Springs, WV 25411	do	Huntingdon.
Stone:			
Corson Lime Co.[2]	Box 177 Cleburn, TX 76031	Quarry	Montgomery.
General Crushed Stone Co	Box 231 Easton, PA 18042	do	Bucks, Chester, Delaware, Lancaster, Luzerne, Perry.
Glasgow Inc	Box 248 Glenside, PA 19038	do	Montgomery.
Martin Marietta Corp	Box 30013 Raleigh, NC 27612	do	Centre, Chester, Fayette, Northampton.
New Enterprise Stone & Lime Co. Inc	New Enterprise, PA 16664	do	Bedford, Blair, Cumberland, Franklin, Huntingdon, Somerset.
Sulfur (recovered):			
Atlantic Richfield Co	3144 Passyunk Ave. Philadelphia, PA 19145	Plant	Philadelphia.
British Petroleum Corp. Ltd	Box 428 Marcus Hook, PA 19061	do	Delaware.
Gulf Oil Corp	Box 7408 Philadelphia, PA 19101	do	Philadelphia.
Tripoli:			
Keystone Filler & Manufacturing Co	Muncy, PA 17756	Pit	Northumberland.
Vermiculite (exfoliated):			
W. R. Grace & Co	62 Whittemore Ave. Cambridge, MA 02140	Plant	Lawrence.

[1]Also stone.
[2]Also lime.
[3]Also iron and steel slag.